In-Depth

Overview

Points To Remember About Osteonecrosis

- Osteonecrosis is a bone disease that may cause pain or limit physical activity.
- Anyone can get osteonecrosis, but it is most common in people in their 30s, 40s, and 50s.
- Osteonecrosis results from the loss of blood supply to the bone. Without blood, the bone tissue dies and the bone collapses.
- Loss of blood supply to the bone can be caused by medicines or medical procedures, medical conditions, alcohol use, injury, or increased bone pressure. It is not always known what causes the loss of blood supply to the bone.
- Most people with osteonecrosis need treatment. Your treatment options may be nonsurgical, surgical, or both.

Osteonecrosis is a bone disease in which the bone begins to die and collapse. It is also called:

- Avascular necrosis.
- Aseptic necrosis.
- Ischemic necrosis.

Osteonecrosis can develop in any bone, most often in the:

- Thigh bone (femur).
- Upper arm bone (humerus).
- Knees.
- Shoulders.
- Ankles.

If you have osteonecrosis, you may have it in just one bone or in more than one bone. You may have it in different parts of your body at the same time.

What happens in osteonecrosis?

Osteonecrosis is caused by the loss of blood supply to the bone. Without blood, the bone tissue dies, causing the bone to break down and collapse.

In people with healthy bones, the body makes new bone to replace old or injured bones. This process takes place during normal growth and after an injury to keep the bones strong. If you have osteonecrosis, your bone breaks down faster than your body can make enough new bone.

The prognosis for people with osteonecrosis varies from person to person. It depends on what part of the bone is affected by osteonecrosis, how much of the bone is affected, and how well the bone rebuilds itself.

Most people with osteonecrosis require treatment to prevent further bone damage, protect the bones and joints, and improve the use of joints with osteonecrosis.

Without treatment, the disease worsens and bone and joints break down and most people with the disease will have severe pain and limited movement within two years.

Who Gets

Anyone can get osteonecrosis, but certain factors increase your risk of developing the disease.

Sex

Generally, osteonecrosis is much more common in males than in females.

Age

Osteonecrosis most commonly occurs in people who are in their 30s, 40s, and 50s.

Medicines or Medical Treatments

Some medicines or medical treatments increase the risk of osteonecrosis:

- Chemotherapy.
- Radiation therapy.
- High-dose steroids.
- Organ transplants.

Medical Conditions

Some medical conditions increase the risk of osteonecrosis:

- Cancer.
- Lupus.
- HIV/AIDS.
- Gaucher’s disease.
- Decompression sickness, also known as divers' disease, the bends, or caisson disease.
- Gout.
- Vasculitis.
- Osteoarthritis.
- Osteoporosis.
- Blood disorders, such as sickle cell disease.

Alcohol Use

Excessive alcohol use causes fatty substances to build up in the blood vessels. This can cause a decreased blood supply to the bone, which can lead to osteonecrosis.

Injury

A broken or dislocated bone or a joint injury may damage the surrounding blood vessels. This can cause a decreased blood supply to the bone, which can lead to osteonecrosis.

Symptoms

Osteonecrosis does not always cause symptoms, especially when it first develops. As the disease gets worse, you may feel pain when you put your weight on a joint that is affected by osteonecrosis. Over time, you may feel pain in the joint even when you are resting.

Pain caused by osteonecrosis may be mild or severe. If it causes your bone and joint to collapse, you may have severe pain and not be able to use the joint. For instance, if you have osteonecrosis in the hip, you may not be able to walk.

Causes

Osteonecrosis results from the loss of blood supply to the bone. Loss of blood supply to the bone can be caused by:

Medicines or Medical Procedures

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- Radiation therapy.
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- Organ transplants.

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Diagnosis

If your doctor suspects you have osteonecrosis, he or she will take your medical history and do a physical exam. Your doctor may also order one or more tests to see which bones are affected and the amount of bone affected.

X-Ray

An x-ray is a picture of the bones that may help your doctor diagnose the cause of your pain. However, an x-ray is not sensitive enough to detect bone changes that may be a sign of osteonecrosis; because of this, your doctor may order more tests even if your x-ray is normal. As osteonecrosis worsens, an x-ray may show bone damage caused by the disease. If you are diagnosed with osteonecrosis, x-rays are often used to monitor the disease.

Magnetic Resonance Imaging (MRI)

An MRI is a form of imaging that detects chemical changes in the bone marrow. It provides your doctor with a picture of the part of your bone or bones that are affected by osteonecrosis, whether or not you have symptoms, and how well your bones are rebuilding themselves. An MRI is the most sensitive test for diagnosing osteonecrosis in its earliest stages.

Computed Tomography (CT) Scan

A CT scan is a form of imaging that provides your doctor with a 3D (three-dimensional) picture of your bones. A CT scan also shows “slices” of the bone, making the picture much clearer than an x-ray or bone scan. However, not all doctors agree that CT scans are useful to diagnose osteogenesis. Although doctors can usually diagnosis osteonecrosis without a CT scan, it may be useful in determining the extent of bone damage.

Bone Scan

A bone scan is a form of imaging that is used in patients who have normal x-rays and no risk factors for osteonecrosis. A bone scan can detect all bones and joints in the body that are affected by osteonecrosis. In this test, a harmless radioactive material is injected into the body, and then a picture of the bone is taken with a special camera. The picture shows how the injected material travels through blood vessels in bone.

Biopsy

A biopsy is a surgical procedure in which a tissue sample from your bone is removed and studied to determine whether you have osteonecrosis. A biopsy is rarely recommended because it requires surgery.

Functional Evaluation of Bone

If you have normal x-rays, MRIs, and bone scans buy your doctor still suspects you may have osteonecrosis, he or she may order tests that measure the pressure inside of your bone or bones. Increased pressure is a sign that you may have osteonecrosis.

Osteonecrosis that is diagnosed early is easier to effectively treat.

Treatment

There are several treatments for osteonecrosis. The goals of treatments are to:

- Improve use of the joint.
- Stop further damage.
- Protect bones and joints.

Your treatment options may include surgery or nonsurgical treatments, such as medicines. Your doctor will determine the best treatment for you based on several factors, including:

- Your age.
- The stage of the disease.
- Where and how much bone has osteonecrosis.
- The cause, if known. If the cause is steroid or alcohol use, treatment may not work unless

you stop using those substances.

Nonsurgical Treatments

Non-surgical treatments do not cure osteonecrosis, but they may help manage the disease. Your doctor may recommend one or more non-surgical treatments, especially if the disease is in its early stages:

Medications

- Nonsteroidal anti-inflammatory drugs (NSAIDs) are used to reduce pain and swelling.
- If you have blood-clotting problems, blood thinners may be used to prevent clots that block the blood supply to the bone.
- If you take steroid medicines, cholesterol-lowering drugs may be used to reduce fat in the blood.

Taking Weight Off the Joint

Your doctor may suggest you limit your activity or use crutches to take weight off joints with osteonecrosis. This may slow bone damage and allow some healing. If combined with NSAIDs, it may help you avoid or delay surgery.

Range-of-Motion Exercises

Your doctor may recommend you exercise the joints with osteonecrosis to help improve their range of motion.

Electrical Stimulation

Your doctor may recommend electrical stimulation therapy to help bone growth.

Surgery

Most people with osteonecrosis eventually need surgery as the disease worsens. Some people with early stage disease may need surgery if non-surgical treatments do not help.

There are four types of surgery. Your doctor will decide if you need surgery and what type is best for you.

- **Core decompression surgery,** which lowers the pressure inside the bone. This increases blood flow to the bone.
- **Osteotomy,** which reshapes the bone. This reduces stress on the damaged joint.
- **Bone graft,** which takes healthy bone from one part of the body and uses it to replace diseased bone.
- **Total joint replacement,** which replaces the joint with a man-made one.

Research Progress

There is research underway to help people with osteonecrosis. Research hope to better understand:

- How many people have osteonecrosis.
- Risk factors for osteonecrosis.
- Why steroids cause osteonecrosis.
- The role of genes.
- How to diagnose the disease early.
- Better treatments for osteonecrosis.
- Ways to improve hip replacement.
- How mechanical factors, such as the alignment of hips, knees, and ankles, affect treatment success.

Related Resources

U.S. Food and Drug Administration
Toll free: 888-INFO-FDA (888-463-6332)
Website: https://www.fda.gov

Drugs@FDA at https://www.accessdata.fda.gov/scripts/cder/daf Drugs@FDA is a searchable catalog of FDA-approved drug products.

Centers for Disease Control and Prevention, National Center for Health Statistics
Website: https://www.cdc.gov/nchs

National Institute of Dental and Craniofacial Research
Website: https://www.nidcr.nih.gov

American Academy of Orthopaedic Surgeons
Website: https://www.aaos.org (con información en español)

The Hip Society
Website: https://www.hipsoc.org

National Osteonecrosis Foundation
Website: https://www.nonf.org

Arthritis Foundation
Website: https://www.arthritis.org

If you need more information about available resources in your language or other languages,

please visit our webpages below or contact the NIAMS Information Clearinghouse at NIAMSInfo@mail.nih.gov.

- Asian Language Health Information
- Spanish Language Health Information

Join a Clinical Trial

Find a Clinical Trial

Related Information

Osteonecrosis: Esenciales: hojas informativas de fácil lectura

View/Download/Order Publications

Osteonecrosis, Easy-to-Read Fast Facts
Oral Health and Bone Disease
Osteonecrosis (Avascular Necrosis), Questions and Answers about